

## **REMARKS**

Claims 1-12 and 14-22 are pending in the application. Claims 6-12 and 17-22 are withdrawn. Claims 1 and 2 are currently amended. Claim 13 is cancelled. Applicant respectfully requests for allowance of the elected claims 1-5 and 14-16 based on following discussions.

### **Rejections under 35 USC 112**

Claims 1-5 and 14-16 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, Examiner regards phrases recited in claim 1 “setting an initial flow out of the chamber for achieving a pressure above the required pressure” and “a transient period which does not allow the pressure to exceed the required pressure” as contradictory. In response, claim 1 is amended by replacing the above-mentioned phrases with “setting an initial flow out of the chamber to increase a rate of pressure increase, which, if allowed to sustain beyond a transient period, would have caused a pressure in the chamber to exceed the required pressure.” As such, Applicant respectfully requests that the rejection against claim 1 under 35 USC 112, second paragraph, be withdrawn.

Claims 2-5 and 14-16 are rejected under 35 USC 112, second paragraph, due to their dependency from claim 1. For the reasons discussed above, Applicant respectfully requests that the rejections against claims 2-5 and 14-16 be withdrawn as well.

### **Rejections under 35 USC 103**

Claims 1-5, 15, and 16 are rejected under 35 USC 103(a) as being unpatentable over US Patent No. 6,474,949 to Arai et al. (hereinafter referred to as “Arai”) in view of US Patent No. 5,944,049 to Beyer et al. (hereinafter referred to as “Beyer”).

Claim 1, as amended, is directed to a method of setting the pressure in a chamber of a vacuum system to a required pressure, the system comprising a pressure control system including a pump for evacuating gas from the chamber, a valve down stream of the pump, and a flow controller for allowing the flow of gas into the chamber, the method comprising: setting an initial flow out of the chamber to increase a rate of pressure increase, which, if allowed to sustain beyond a transient period, would have caused a pressure in the chamber to exceed the required pressure, and setting a preset flow out of the chamber after the transient period has elapsed for achieving and maintaining the required pressure higher than an initial pressure in the chamber at a moment when the initial flow is set, wherein the setting comprises varying a conductance of the valve down stream of the pump, wherein the chamber is specifically used in flat panel display processes, wherein during the transient period, the pump speed is reduced so that the amount of gas which leaks up-stream across the pump increases so as to increase the gas flowing into the chamber, thereby reducing the transient period for the initial pressure to increase to the required pressure. It is noted that the underlined portion of the claim language is added by the current amendment.

***A. Neither Arai nor Beyer teaches “setting a preset flow out of the chamber after the transient period has elapsed for achieving and maintaining the required pressure***

***higher than an initial pressure in the chamber at a moment when the initial flow is set.***

The objective of Arai is to reduce the diameter of the exhaust pipe of a vacuum pump, without subjecting the pump to an overload. *See, col. 1, lines 60-65.* In order to achieve the objective, Arai teaches a

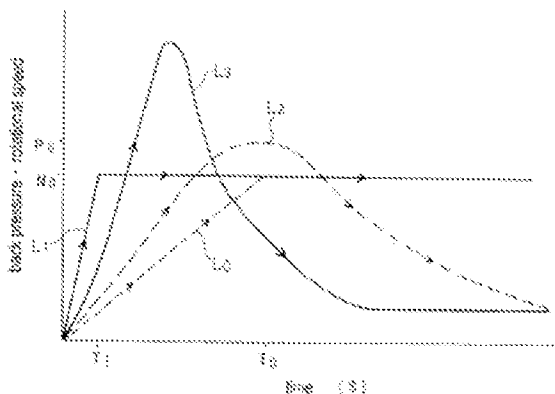
method where an initial pump speed is set to be low to avoid an overload caused by high back pressure. *See, col. 4, lines 5-21.*

As the back pressure drops gradually below a predetermined value, the pump speed is increased to bring the back pressure to a desired lower pressure, and

sustain it at such level. *Id.* As shown in FIG. 3 of Arai, the back pressure at the sustained level is lower than that during the transient period. This differs from the claimed invention where the required pressure in the chamber after the transient period is higher than the initial pressure before or during the transient period. It is noted that in FIG. 3, the initial back pressure being plotted at zero does not mean that the initial pressure in the chamber is also at zero. Since Arai is directed to avoiding an overload during a pump-down process, the initial pressure in the chamber would be higher than the pressure in the chamber when the back pressure reaches a sustained level.

Neither does Beyer teaches “setting a preset flow out of the chamber after the transient period has elapsed for achieving and maintaining the required pressure higher than an initial pressure in the chamber at a moment when the initial flow is set.” Beyer is

FIG. 3



cited for its teaching of controlling the effective pump speed by adjusting a downstream valve. It does not teach how the pressure in the chamber is supposed to be manipulated during and after the transient period.

***B. It would not have been obvious for a person skilled in the art to modify Arai by setting the pressure in the chamber after the transient period higher than that before the transient period.***

As discussed above, the objective of Arai is to reduce the footprint of the vacuum pump by reducing the diameter of the exhaust pipe, while protecting the pump from an overload caused by the shrunk pipe. Arai achieves the objective by reducing the pump speed and dragging the pump-down time longer than it would have been the case had the diameter of the exhaust pipe not been enlarged. It is clear that Arai puts the need for shrinking the size of the exhaust pipe before the need for reducing the pump-down time.

Unlike Arai, the claimed invention primarily concerns about reducing the time needed for a chamber to be filled with process gases at a predetermined pressure. The manipulation of pump speed is for the purpose of reducing the transient period. Any method that would prolong the transient period is simply contradictory to and therefore teaches away from the claimed invention.

A prima facie case of obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465 (Fed. Cir. 1997). For the reasons discussed above, Applicant respectfully submits that Arai teaches away from the claimed invention. Thus, it would not have been obvious for a person skilled in the art to modify Arai by setting the pressure in the chamber after the transient period higher than that before the transient period.

***C. The claimed invention is specifically applied in flat panel display processes, whereas Arai does not.***

The claimed invention is specifically applied in flat panel display processes where large chambers are used, and therefore the need for reducing pump-up time is significant and the use of pump speed reduction to shorten the pump-up time is suitable. Unlike the claimed invention, it is reasonable to suggest that Arai is directed to general semiconductor processes. Typically, general semiconductor processes use much smaller chambers, require much smaller gas flows than the flat panel processes do, and therefore are not very sensitive to the transient time reduction of pumping cycles. Since Arai favors footprint reduction over transient time reduction, Applicant must presume that its method is not specifically for applications in flat panel processes.

Thus, Applicant respectfully submits that claim 1 is patentable over Arai in view of Beyer under 35 USC 103(a). Accordingly, claims 2-5, 15, and 16 that depend from claim 1 and include all the limitations recited therein are also patentable over the cited references under 35 USC 103(a).

Claim 14 is rejected under 35 USC 103(a) as being unpatentable over Arai, in view of Beyer and US Patent No. 6,142,163 to McMillin et al. (hereinafter referred to as “McMillin”).

Claim 14 depends from claim 1 and includes all the limitations recited therein. For the reasons discussed above, Applicant respectfully submits that claim 14 is also patentable over the cited prior art references under 35 USC 103(a).

## CONCLUSION

Applicant has made an earnest attempt to place this application in an allowable form. In view of the foregoing remarks, it is respectfully submitted that claims 1-5 and 14-16 are drawn to a novel subject matter, patentably distinguishable over the prior art of record. Examiner is therefore, respectfully requested to reconsider and withdraw the outstanding rejections.

Should Examiner deem that any further clarification is desirable, Examiner is invited to telephone the undersigned at the below listed telephone number.

Applicant does not believe that any additional fee is due, but as a precaution, the Commissioner is hereby authorized to charge any additional, necessary fee to deposit account number 50-4244.

Respectfully submitted,

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